600.41 - Support Guidance for Planning Step 5 - Formulation of Resource Management Systems (RMS)

(a) General

The resource management system guidance provided in this handbook is directly related to the FOTG and the FOTG policy, General Manual 450, Part 401. The tools in this handbook help to develop quality resource management systems and assist the planning process.

Planning the soil, water, air, plant, and animal resources and their interrelationships has increased the complexity of assisting decisionmakers. The planner can no longer provide alternatives and assistance that address individual problems without being aware of the effects on all resources. NRCS involvement with water quality has brought this reality to the forefront, as has the public's growing concern for the environment, especially wetland protection, food and water safety, fish and wildlife protection and enhancement, and a sustainable agriculture.

NRCS must constantly strive to improve methods to evaluate the potential effects of conservation practices on the resources. The physical effects relevant to each resource must be assessed during the planning process since a conservation practice that has a positive effect on one resource problem may have a positive or negative effect on other resources. One conservation practice usually does not completely solve a problem when all of the resources are considered. The objectives of the client also factor into the process.

(b) Purpose

This guidance emphasizes to planners the realization that resources are interrelated and that the treatment of one resource may affect another. It also shows the importance of formulating an RMS in recognition of these interrelationships by providing a process that:

- Starts with the determination of identified and predictable resource problems (step 1 of the planning process)
- Considers the effects of practices on individual aspects of each resource for specific land uses
- Facilitates combining practices into potential RMS options, and
- Helps evaluate the potential options against quality criteria for an RMS

Additionally, the physical effects used in formulating RMS options for solving identified and predictable problems in typical conservation planning situations are addressed. When coupled with analytical tools such as Cost and Return Estimator, Grazing Lands Applications and state supported computer decision aids, it provides the basis for decisions by those involved.

(c) Conservation Effects Concept

The planner needs to recognize the effect of applying conservation practices so he or she can select combinations of practices that solve the identified or predictable problems without creating new problems at interrelated geographic scales. In addition, secondary benefits should be identified. The effects concept is applicable to formulating RMS options for specific fields or land units, conservation management units (CMUs), or other planning areas. It can also be used to assist in developing FOTG guidance documents, and to explain resource problems and

potential solutions to the decisionmaker and others. It is simply another tool to assist the planning process.

Technical materials also aid in evaluating the effects of applying resource management systems on the identified and predictable problems affecting the resources dealt with in conservation planning at various or interrelated levels. They are excellent training tools for establishing a pattern of thinking for developing effective RMSs in conservation planning assistance with individuals in actual situations. When making planning recommendations, the planner must be reasonably certain that the identified and predictable resource problems are treated without creating new problems in one or more of the other resources, as well as interrelated planning areas. RMS options formulated must meet established quality criteria. This handbook provides the process and working tools for consistently achieving adequate treatment of the resources.

The Site-Specific Practice Effects worksheet (NPPH, Subpart F, Exhibit 4) and the Resource Management System Options worksheet (NPPH, Subpart F, Exhibit 5) are not required for each conservation plan. Their use depends on the experience of the conservationist and the complexity of the situation. Once the process is understood and implemented, only unique or complex situations warrant documentation of the complete process. This will be addressed in more detail in paragraph 600.41(e), How To Use The Effects Concept.

(d) Conservation Practice Physical Effects (CPPE)

The CPPE matrix displays in subjective detail the physical effects that conservation practices have on resource problems for the natural resources based on experience and available technical information. A completed CPPE is to be filed in the FOTG, Section V-A-I. Each resource may have multiple problems that are represented by the various columns. The effects of practices may be greater if they are associated with a land use change. On-site effects of practices are generally greater than off-site effects. The further away a practice is from the problem or treatment, generally the less effect it will have.

The key question that should be asked when reviewing the CPPE is "If this practice is applied, what effect will it have on the target problem and all the other resource problems contained in the column headings?" The ratings shown in the column blocks are explained in paragraph 600.41(g), Resource Management Systems: Glossary and Explanations. The headings in each column of the CPPE briefly describe identified or predictable resource problems. Some of the column headings have expanded explanations in the terminology and explanations section.

Example:

If no-till is being considered for treating an identified sheet and rill erosion problem and a nitrate-nitrogen ground water problem also exists, the CPPE will assist the user in identifying the physical effects of no-till on these problems. In this case, no-till will significantly reduce the sheet and rill erosion problem because of increased surface cover and decreased soil disturbance. However, no-till may cause a slight increase in soluble nitrate nitrogen infiltration depending on the time and method of application, rainfall, nutrient form, vadose zone, organic matter, soil texture and structure, macropores, and depth to water table. By reviewing the CPPE, the user can quickly identify both the positive and negative potential effects of a particular practice. These effects need to be tailored to local conditions and taken into account in formulating a RMS.

The conservation practices shown in the CPPE will be installed according to practice standards and specifications shown in the FOTG, Section IV.

The CPPE was developed nationally for commonly used practices. Each state needs to develop effects for additional practices applicable to their needs. As knowledge and experience are gained in working with the CPPE, states may wish to further refine it to Major Land Resource Areas, subareas, or other areas to better reflect typical conditions in the state. It is imperative that an interdisciplinary group be used in refining existing entries and when adding additional practices to the CPPE. This will ensure proper consideration of all resource problems/opportunities. If there is a need to identify a resource problem that is not included in the present CPPE column headings, an "other" column may be used under the appropriate resource to list the problem and include the effects.

The effects listed in the CPPE are displayed for general conditions nationwide or as modified by the state. If these general effects need to be modified to fit state conditions, any explanations described in the third column (Other/Explanations) need to be considered. This will assure that local conditions either do or do not fit the conditions described for the practice in the CPPE. Not all conservation practices listed have special settings identified. If the CPPE is modified, it is necessary to have a good definition of the situation for which the conservation practice effects are being displayed. The effects under the column headings are dependent on any explanations as defined in the third column.

Example:

Brush management is displayed for four methods (mechanical, chemical, prescribed burning, and biological). If the local conditions fit the description in one or more of these methods, the displayed effects may be used directly. If the description is changed, the effects need to be reviewed to see if they are still appropriate.

Conservation crop rotation is essential in developing an RMS on land used for crop production and establishes the base from which it is developed. The crop rotation and sequence of the crops planned in the rotation were not evaluated in the CPPE because of the wide variation in cropping practices across the country. States need to include in the CPPE three or four crop rotations common to their area to serve as an example. These example rotations should be evaluated, using conventional tillage, across all applicable columns following the format used for the practices that are presently included.

Irrigation system, sprinkler, is displayed for converting a furrow surface irrigation system to a sprinkler system. If a sprinkler system is planned to be installed on land not previously irrigated, a new display of effects would be needed.

Effects displayed should be those influencing the selection of a specific conservation practice or practices. Some practices are primary, resulting in treatment of the main resource problem(s) identified. Others are supporting - they facilitate a primary practice and may not have a direct effect; however, they are needed to achieve the desired treatment. These practices are generally associated with management practices, but can be used to facilitate structural or vegetative practices, or both. Some can stand alone in certain situations. A practice may facilitate more than one primary practice.

Example:

An example of a primary practice is a terrace. When needed for the terrace to function effectively, an underground outlet is an example of a supporting practice that facilitates another practice. In this case the underground outlet by itself does not have a direct effect; therefore, its effect should be shown as "facilitates terrace."

A facilitating practice is rated on the RMS Options worksheet only where it has a direct effect on the resource problem shown in the column heading.

In developing guidance documents, the typical problems/opportunities encountered in the field office work area are identified. The CPPE may be used to select the different practices which combine to form the RMS options in the guidance documents (FOTG, Section III). The guidance documents provide the conservationist the foundation of RMS options to be applied to the expected planning situations in the field office area.

(e) How to Use The Effects Concept

The first step in formulating an RMS with a decisionmaker is to establish all identified or predictable resource problems and/or opportunities in the planning area and determine how they relate to each of the resources. The effects shown on the CPPE are based on the condition that the practice being evaluated is not presently applied. The planner should understand that the problems/opportunities identified on a field or CMU occur under present management and

conditions. During planning, an existing field may be divided into more than one field or CMU because of different soils, planning objectives, or other characteristics in treating problems that are not applicable to the entire field. The effects shown in the CPPE should be applied to the proposed field or CMU.

The effects shown on the CPPE are often displayed as a range and generally need to be refined to site-specific effects to address the problems/opportunities in the planning area where technical assistance is being provided. This can be done using the Site-Specific Practice Effects worksheet.

After the resource problems/opportunities for the specific site have been identified, the applicable conservation practice effects can be considered using the information in the CPPE. The selected practices are then listed on the Site-Specific Practice Effects worksheet, and the site-specific effects are entered in the appropriate block using such terminology as not applicable, negligible, slight, moderate, significant, or facilitating a specific practice.

Where a land use change is considered as an option, the effects of practices that cause the land use change are evaluated against present conditions. The effects of the other practices necessary to manage the new land use are evaluated based on the new land use.

Example:

Where a land use conversion from crop to pasture occurs, the effects of pasture planting should be evaluated for the problems identified on the crop field. The other practices relating to pasture, such as pasture management and planned grazing systems, should be evaluated for the predicted problems that may occur on the pasture.

At this point, the list of conservation practices can be scanned, choosing the ones that have a high potential to solve one or more resource problems without increasing problems on another resource. When the practice list is complete on the Site-Specific Practice Effects worksheet, conservation practices are selected for their major effects on identified or predictable resource problems/opportunities. These practices are combined into candidate RMS options and entered on the Resource Management System Options worksheet as discussed with the decisionmaker during the planning process. These effects may be displayed in the appropriate block using N/A for not applicable, (+) for a positive, (-) for a negative, or (0) for negligible effects. The letter F in the block indicates a facilitating practice.

The primary reason for displaying the pluses and minuses in the RMS Options worksheet is to indicate differences in the effects of the options. For instance, while all the options meet the minimum quality criteria, one option may be very strong in the soil resource and not quite as strong in one or more of the other resources. In contrast, another option may be very strong in the water and animal resources and not quite as strong in the soil resource. Therefore, clients can better understand the benefits of all the options so they can select the one that best meets their objectives.

Selecting an acceptable combination of practices is a technical skill that requires ingenuity and warrants a great deal of attention. Some practices will be needed to offset limiting features of other practices.

Once the combinations have been completed that meet the quality criteria for each of the identified resources affected, the combinations of practices become viable RMS options.

Although the worksheets are used as planning tools to develop sound conservation alternatives, especially when complex situations are encountered in the field, they are also designed for formulation of guidance documents and can be used for training. They can also be used to document physical effects of specifically planned RMSs to show the decisionmaker or others what impacts can be anticipated.

Example:

Assume that a land user has been contacted by a state dairy inspector and notified that the landowner's operation will be shut down in 90 days unless measures are taken to reduce pollution. The landowner contacts NRCS for assistance. In this case, it may be advisable to complete the Site-Specific Practice Effects worksheet and the RMS Options worksheet to ensure comprehensive evaluation of the problems and potential treatments. These worksheets can also be used to assist the landowner in selecting the best option and to document to the state agency that progress is being made in correcting the identified problems.

The Site-Specific Practice Effects worksheet and the Resource Management System Options worksheet are not required for each conservation plan. This depends on the experience of the conservationist and the complexity of the situation.

(f) Forms

The two worksheets (Site Specific Practice Effects worksheet and Resource Management System Options worksheet) can be used in conjunction with the CPPE to aid the planning process (See NPPH, Subpart F, Exhibit 4 and Exhibit 5).

(1) Site Specific Practice Effects Worksheet (Exhibit 4)

This worksheet uses the practices in the CPPE to list the most applicable conservation practices to address site-specific identified or predictable resource problems and opportunities while considering land user objectives. It displays effects for only the identified resource problems that exist, are predicted on the planning area, or have influence off-site. This array of practices lends itself to a quick comparison of the relative value of each practice, including both positive and negative effects on the resource problems identified.

(2) Resource Management System Options Worksheet (Exhibit 5)

Conservation practices having the potential to solve the resource problems listed on the Site-Specific Practice Effects worksheet are now grouped in combinations and placed on the RMS Options worksheet to address the identified site-specific problems. The different combinations of practices become RMS options when the quality criteria have been achieved for all the identified and predictable resource problems.

The system the land user is currently following should be rated across the top of the RMS Options worksheet. The next step is to compare this to the options developed.

After the RMS options have been developed, the Conservation Effects process may be followed if the land user needs additional information to reach a decision (step 7 of the planning process).

Together, these technical tools provide a powerful new technique to plan, evaluate, and select among alternative systems.

(g) Resource Management Systems: Glossary and Explanations

This glossary contains ratings effects definitions, elaboration of column headings, and special terminology. All column headings in the Conservation Practice Physical Effects (CPPE) matrix represent an identified or predictable problem that needs to be treated.

(1) Ratings Effects Definitions

Not applicable

The conservation practice being evaluated has no relationship to (*i.e.*, no effect on) the conservation problem identified.

Negligible

The practice does have an effect on the problem of concern, but the effect is insignificant.

Slight

Some non-measurable effect (positive or negative) of the practice on the resource problem of concern, but not enough to influence the decision to select the practice to solve the problem.

Moderate

A measurable effect (positive or negative) of the practice on the resource problem of concern that would influence the selection of the practice in RMS options.

Significant

A major measurable effect (positive or negative) of the practice on the resource problem that would have a major influence on the selection of the practice in RMS options.

Range of effects

The effect of a single practice on a given resource problem that is shown in the CPPE may vary depending on the local conservation management unit, climate, topography, geology, soils, vegetation, and hydrologic conditions. Therefore, a range of possible effects may be presented. Sometimes the types of physical conditions that cause the range of effects are listed in the column. In other cases, a reference is made to an expanded definition elsewhere as noted.

The CPPE shows a range of effects that applies on a national basis to a conservation management unit (CMU). However, when used by a field office, the proper effects or range of effects apply to a CMU that has specific topography, soils, hydrology, plants, and animals.

If several CMUs are treated, significant cumulative or synergistic effects are probable. For example, if the cumulative effects in a watershed consisting of several CMUs are evaluated, the slight off-site effect of one practice could increase to a moderate or significant effect. The national CPPE does not reflect cumulative effects.